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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO WASHING IN THE PRESENCE OF SODIUM HYPOCHLORITE

(First Revision)

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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO WASHING IN THE PRESENCE OF SODIUM HYPOCHLORITE

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 20 July 1888, after the draft finalized by the Chemical Methods of Test Sectional Committee had been approved by the Textile Division Council.

0.2 This standard was first published in 1962 and has been revised on the basis of experience gained during its use. Changes have been made in the preparation of composite specimen, sampling, apparatus and assessment of colour fastness ratings to bring it in line with other similar Indian Standards on colour fastness tests.

0.3 Colour fastness of textile materials is of considerable importance to the consumer. The fastness depends not only upon the nature and the depth of shade of the dyestuff used but also upon the nature of the fibre and the method of dyeing or printing employed; the same colouring matter, when used in dyeing or printing different fibres or when applied by different methods upon the same fibre, may give vastly different results. Formulation of standard methods of test for determining colour fastness of textile materials to different agencies likely to effect change in colour is, therefore, necessary.

0.4 The colour fastness of textile materials is affected when they are washed at high temperatures in the presence of sodium hypochlorite. The method of test prescribed in this standard is intended to evaluate the colour fastness of textile materials when treated thus.

0.5 Since certain fibres (for example, protein fibres, like wool) are damaged by such treatment, this method is applicable only to those fibres which are capable of withstanding such conditions.

1. SCOPE

1.1 This standard prescribes a method for determination of colour fastness of textile materials of all kinds and in all forms to washing at high temperatures in the presence of sodium hypochlorite. It is applicable only to those fibres which are capable of withstanding such conditions.

2. PRINCIPLE

2.1 A specimen of the textile in contact with specified adjacent fabrics is agitated in a solution of soap, sodium carbonate and sodium hypochlorite, rinsed and dried. The numerical ratings for change in colour of the specimen and staining of the adjacent fabrics are evaluated with grey scales.

3. SAMPLING

3.1 Sample to determine the conformity of a lot of coloured textile material to a specification shall be selected so as to be representative of the lot.

3.2 Sample drawn in compliance with the relevant material specification or as agreed to between the buyer and the seller to evaluate colour fastness of the material in the lot shall be held to be representative of the lot.

4. COMPOSITE SPECIMEN

4.1 Two Adjacent Fabrics — Each measuring 10 × 4 cm, one piece made of same kind of fibre as that of the textile to be tested, or that predominating in the case of blends, the second piece made of the fibre as indicated below, or in the case of blends, of the kind of fibre second in order of predominance, or as otherwise specified.

If First Piece is:	*Second Piece to be:*
cotton	wool
wool	cotton
silk	cotton
linen	cotton
viscose	wool
acetate	viscose
polyamide	wool or viscose
polyester	wool or cotton
acrylic	wool or cotton

4.2 Preparation of Composite Specimen

4.2.1 If the textile to be tested is fabric, draw a 10 × 4 cm specimen from the sample and place it between the two pieces of adjacent fabrics (*see* **4.1**); sew around all four sides to form a composite specimen.

4.2.2 If the textile to be tested is yarn, knit or weave some of the sample into fabric, draw from it a 10 × 4 cm specimen and place it between the two pieces of adjacent fabrics (*see* **4.1**); sew around all four sides to form a composite specimen. Alternatively, taking an amount of yarn weighing approximately half the combined mass of the pieces of adjacent fabrics (*see* **4.1**), prepare a 10 × 4 cm specimen in the form of parallel lengths of yarn. Place it between the two pieces of adjacent fabrics and sew around all four sides to hold the yarn in place and to form a composite specimen.

4.2.3 If the textile to be tested is loose fibre, comb and compress an amount of fibre weighing approximately half the combined mass of the pieces of adjacent fabrics (*see* **4.1**), into a sheet to make a 10 × 4 cm specimen. Place the sheet between the two pieces of adjacent fabrics and sew around all four sides to form a composite specimen.

5. QUALITY OF REAGENTS

5.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS: 1070-1977*) shall be used where the use of water as a reagent is intended.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

6. APPARATUS

6.1 Suitable Mechanical Device — consisting of a water bath containing a rotatable shaft which supports, radially, glass or stainless steel containers (75 ± 5 mm diameter × 125 ± 10 mm high) of approximately 550 ± 50 ml capacity, the bottom of the containers being 45 ± 10 mm from the centre of the shaft. The shaft container assembly is rotated at a frequency of 40 ± 2 min^{-1}. The temperature of the water bath is thermostatically controlled to maintain the test solution at the prescribed temperature ± 2°C.

NOTE — The wash wheel sponsored by the Society of Dyers and Colourists, or the launderometer sponsored by the American Association of Textile Chemists and Colourists, or any other mechanical device giving identical results may be used for this test.

6.2 Stainless Steel Balls — Ten, each approximately 6 mm in diameter.

6.3 Grey Scales for Evaluating Change in Colour and Staining

7. REAGENTS

7.1 Soap-Soda Solution — containing 5 g of soap and 2 g of anhydrous sodium carbonate per litre of solution. The soap shall contain not more than 5 percent moisture and shall comply with the following composition (based upon dry mass):

Free alkali, calculated as Na_2CO_3, *Max*	0·3 percent
Free alkali, calculated as NaOH, *Max*	0·1 percent
Combined fatty acids, calculated as Na salt, *Min*	85 percent
Titre of mixed fatty acids prepared from the soap, *Max*	39°C
Iodine value of fatty acids, *Max*	50

7.1.1 The soap shall be free from optical brightening agents.

7.2 Sodium Hypochlorite Solution — containing 10 g/l of available chlorine, freshly prepared, having a *p*H between 10·8 and 11·2.

7.3 Acetic Acid Solution — containing 0·14 g of glacial acetic acid per litre.

8. PROCEDURE

8.1 Place the composite specimen in one of the containers of the apparatus together with 10 stainless steel balls.

8.2 Take the necessary amount of soap and soda ash solution (*see* **7.1**) previously heated to 83 ± 2°C. Add to the hot solution, sufficient amount of sodium hypochlorite solution (*see* **7.2**) to make a final concentration of 0·1 g/l of available chloirne and to give a liquor ratio of 50 : 1.

8.3 Pour the solution as obtained in **8.2**, into the container (*see* **8.1**).

8.4 Treat the specimen in the apparatus for 45 minutes at 83 ± 2°C. At the end of this period, drain out the liquor from the container.

8.5 Pour 100 ml of distilled water at 40 ± 2°C into the container and rinse the specimen in the container for one minute, shaking the composite specimen vigorously with water. Drain out the water from the container. Repeat this procedure once more.

8.6 Put 100 ml of acetic acid solution (*see* **7.3**) into the container, shake the container vigorously with the specimen and the acetic acid solution at 27 ± 2°C for one minute. Drain out the acid from the container.

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*Specification for water for general laboratory use (*second revision*).

8.7 Rinse the specimen repeatedly in cold water until it is free from acid.

8.8 Wring the specimen and dry it in air in shade at a temperature not exceeding 60°C.

8.9 Remove the specimen, open it out and separate the two pieces of adjacent fabrics.

8.10 Evaluate the change in colour of the treated specimen by the method prescribed in IS : 768-1982* and the degree of staining of the two pieces of adjacent fabrics by the method prescribed in IS : 769-1982†.

Note 1 — Treated specimen and the two pieces of adjacent fabric should have cooled after drying and should have regained their normal moisture content before evaluation.

Note 2 — In case of doubt in the colour fastness ratings as assessed by an observer, the assessment should be done by at least three observers and the overall average rating should be reported.

9. REPORT

9.1 The report shall state : (a) The numerical rating for change in colour of the test specimen and (b) The numerical ratings for staining of the two pieces of adjacent fabrics used in the preparation of the composite specimen.

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*Method for evaluating change in colour (*first revision*).

†Method for evaluating staining (*first revision*).